Aquaculture in Utah

Newsletter on Current Trends in Aquaculture

Utah Department of Agriculture and Food . Division of Animal Industry

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NEW VIRUS FOUND IN LARGEMOUTH BASS IN SOUTHEAST USA*

Largemouth Bass Virus (LMBV) was first discovered in Santee-Cooper Reservoir in South Carolina in 1996. The virus has only caused disease in largemouth bass and has recently been found in the following 12 states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Missouri, Mississippi, North Carolina, South Carolina, Tennessee, and Texas. LMBV has been found in hatchery broodfish in Florida, Louisiana, Tennessee and Texas and in juvenile hatchery fish in Texas and Arkansas (private stock). Not all-juvenile fish in contaminated waters have tested positive for LMBV. LMBV has been found in bass populations where kills have not occurred. The widespread presence of the virus suggests that it has been around for awhile, although there is not proof of that. The research on this disease is in early stages and may take years of carefully conducted studies to provide all of the answers.

In addition to LMB, other members of the sunfish family have been found infected with the virus including smallmouth bass, bluegill, green sunfish and other sunfish species. The virus has also been isolated from black and white crappie. So far, only largemouth bass have been associated with the clinical disease and death from the LMBV.

Signs include loss of equilibrium, surface floating and swim bladder expansion. Affected fish may be seen swimming on their side just under the water surface with only their pectoral fin exposed. There are no surface lesions and their gills are a normal red. The gas gland and swim bladder appear very red. Some reports note a yellow or brown waxy material coating the lining of the swim bladder.

The virus spreads by passing through the water from infected to non-infected bass. It is unknown if intermediate hosts, eggs or sperm spread the virus. The virus also survives in the mucous from bass skin. Under laboratory conditions the virus grows best at 77-86 degrees F. This may explain why the disease outbreaks occur during hot water conditions. The virus survives for several months in water at ambient temperatures.

The LMB virus is an iridovirus. There are many iridoviruses that infect pokiotherms. Data suggests that LMBV is similar to frog virus (FV-3) and nearly identical to doctor fish virus (DFV-16) and to guppy virus (GV6) found in fish from SE Asia imported into CA for the aquarium trade business. The presence of similar viruses in salamanders raises speculations about the relationship between juvenile salamanders (water dogs) used for live bait and the transmission of the virus. So far, LMBV specimens isolated from different lakes and states have proven to be identical. The LMBV will not harm humans.

Disinfection procedures of hatcheries and equipment have not yet been proven. A mild treatment (10% solution) with a chlorine bleach water mixture and complete drying would probably be effective.

Prolonged thermal stress or a combination of heat and other factors most likely triggers the

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FISH HEALTH PROGRAM STRIVES TO PROMOTE AQUACULTURE

The Utah Department of Agriculture (UDAF) Fish Health Program (FHP) continually strives to meet the needs of licensed aquaculture facilities. We provide a number of services that are beneficial to our customers. Both Kent and Mark work together to solve problems and to provide consultation to aquaculture operators. It is their objective to prevent the spread and introduction of fish disease into Utah. Entry permits are issued to regulate the importation of game fish into Utah. Facilities are either approved or not approved to import fish into Utah based on their stock inspection histories, health statements and facility disease histories.

UDAF performs water quality tests as requested by operators and growers when new aquaculture facilities are licensed. UDAF's goal is to visit and inspect each fee-fishing facility at least once every two years. All water quality results are followed up with a letter to the provider outlining the test findings. This year, UDAF surveyed growers and operators to evaluate their customer service. The questionnaire afforded aquaculture the opportunity of expressing opinions and views on the Fish Health Program. This year, a whirling disease pamphlet was produced and distributed to help educate the public on how to prevent the spread of the disease. Each aquaculture facility approved to sell live fish to the public is inspected annually. Fish tissues are sampled and sent to independent labs to be analyzed for diseases. Each facility is permitted if the results are

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Largemouth Bass Cont'd

virus. Fish with the clinical signs have been found in shallow water. Mortality incidents to date have not substantially impacted the size of populations in lakes and reservoirs. The ability of bass to reproduce does not seem to be impacted.

In the long run Southeast growers may have to learn to live with the disease. One should keep in mind that other diseases, harvest and deaths from angling pressure are responsible for more bass deaths than have been documented in any LMBV kill to date. If bass kills become significantly frequent and severe in a lake, then reducing avoidable stress factors could be considered.

In summary, LMBV features of significant importance include the following:
The virus can survive for several months in the water at ambient temperatures.
The virus is widespread across the southeast states, but is only detected in some lakes and reservoirs.
Healthy bass can carry the virus without evidence of disease.
The virus has been isolated from fish captured in all 4 seasons.
The LMBV fish kills have occurred during times of stress. Warm water and heavy fishing pressure are two common stress features.
Experimentally the virus alone does not cause clinical disease in adults, but does in the juveniles.
The virus is found in the ovaries, which makes vertical transmission a possibility, but this has not been demonstrated.
The virus is spread horizontally in the water from bass to bass.
The virus persists in an infected population for at least 15 months.
Moving apparently healthy bass and other carrier species from one body of water to another may spread the virus and should be avoided.
*Permission to use the Information from the article, "Largemouth Virus", was obtained from the author, Dr. Gary Van Gelder, DVM, PhD (fishingenet.com).

UTAH FISH PATHOLOGIST PRESENTS CRAYFISH DISEASE FINDINGS AT WORLD AQUACULTURE SYMPOSIUM

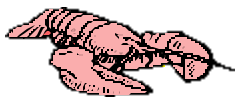
Animal Industry Fish Pathologist, Kent Hauck, traveled to Nice, France in May of 2000 to present information about his recent discovery of a crayfish disease in Utah to the World Aquaculture Society. The virus was discovered in 1996 as the result of an inspection of an aquaculture facility in Northern Utah. Samples of crayfish were taken from the facility and tested at the Ross Smart Veterinary Diagnostic Laboratory at Utah State University. This virus was confirmed using electron microscopopy. The baculovirus is known to infect crayfish in Australia and California, but had not been seen in Utah until its presence was confirmed in 1997.

Kent was among dozens of scientists from around the world who presented information at the symposium. His paper is entitled: "A New Finding and Range Extension of baculovirus in the Freshwater Crayfish *Cherax quadricarinatus* in Utah, North America."

The baculovirus is often found in the crayfish's internal organ called the hepatopancreas. The virus is not known to cause extensive mortality, but is suspect of stunting their growth and affecting their immuno-competancy. The disease is not a threat to humans. Crayfish, like other seafood, should properly cooked.

"This is an exciting discovery for us in the animal health industry, " said Kent. "I was proud to represent the department at the conference in France," he added.

Kent and the UDAF intend to follow-up the discovery with research on methods to more easily detect the virus in crayfish. The department's objective is to help the Utah aquaculture industry establish a population of virus-free crayfish for market.



SURVEY REVEALS THAT UTAH IS IN LINE WITH OTHER WESTERN STATES REGARDING IMPORTATION OF CONTAMINATED FISH

In a May 23, 2000 the Administrative Rules Review Committee of the State Legislature gave an assignment to the Utah Department of Agriculture and Food. The assignment was given to the Fish Health Program to conduct a survey of surrounding states concerning their positions on importation of questionable trout from a hatchery that could be contaminated with a prohibited disease. Ten western states were surveyed. Managers with responsibility for fish importation decisions were contacted by phone. The questionnaire included the following:

How would your agency handle the following situation?

1. You need a certain species of salmonid for in-state propagation.
2. A potential source of the fish is as follows:

- The facility has a history of yearly disease inspections negative for salmonid pathogens;
- Fish at the facility are reared in open waters that may contain a pathogen classified as emergency;
- The fish may be infected with the pathogen;
- Importing the fish presents a possible risk of spreading the disease to your state;
- Testing and quarantine of the facility would be necessary to resolve the disease risks.

3. Would you accept the fish from the facility?

The results of the survey are summarized below:

- Six states said: "No, I would not accept fish from the facility, but would look for another source of the same species that does not present disease risks."
- Two states said: "Yes, I would accept fish from the facility following quar-

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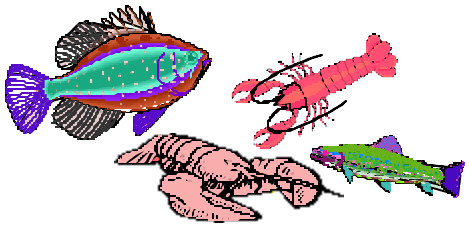
SURVEY RESULTS Cont'd

antine and testing."

- One state said: "Yes, I would accept fish from the facility with additional testing."
- One state said:, "Yes, I would accept fish from the facility without additional testing or quarantine."



RULE CHANGE ADOPTED BY FISH HEALTH POLICY BOARD

Bob and Ester Williams proposed a significant rule change at the Fish Health Policy Board meeting on August 8, 2000. They requested that the current 12-month testing period for approval of fish at a new facility be changed from 12 months to 10 months. The board adopted a measure that the fish in a new facility be tested initially at 6 months (no change) and four months afterwards for initial licensing. The original rules stated that the second test must be 6 months after the first test. This rule change will allow operators to sell their fish two months earlier than before, following negative testing for prohibited pathogens. Trout in existing private hatcheries will continue to be inspected for diseases annually.
The rule (R58-17-15(2)(a)) which became law on October 17, 2000, has been changed as follows:

"For initial approval of new facilities, two inspections of the same lot at least four months apart and negative for any prohibited pathogens pursuant to R58-17-15(D) (2) and (3) are required. The aquatic animals must have been on the facility at least six months prior to the first inspection."

COLORADO OFFICIALS VISIT FISH HEALTH POLICY BOARD

On July 5, 2000, two officials from Colorado attended the Utah Fish Health Policy Board (FHPB) meeting. Pete Walker (Colorado Division of Wildlife) and Ken Cline (Colorado aquaculture representative) addressed concerns regarding the new Colorado aquaculture rule. Members of the Utah Aquaculture Association and the FHPB are concerned with Colorado's new testing requirements for whirling disease. Pete Walker stated that the rule becomes effective on January 1, 2001. Kent Hauck countered that a letter sent to him from Colorado's Linda Chittham (fish pathologist) dictated that the rule became effective on April 1, 2000. Pete Walker explained that the pathologist's statement was in error. Ken Cline stated that Colorado's new rule requiring the employment of PCR for whirling disease detection is not acceptable. He said it is not cost effective and is not accepted by the American Fisheries Society Blue Book. Kent added that there are no commercial laboratories

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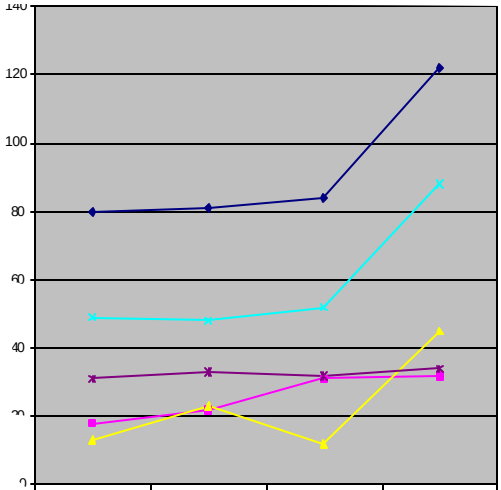
presently validated in the United States for the PCR technique. He said the PCR method is not cost effective and the new Colorado inspection requirements will result in costs that penalize out-of-state growers. Pete explained that trout will now be inspected individually and not in 5-fish pools as done previously. Kent added that under the new Colorado law, the cost to import trout into Utah would increase by about 400 percent. When the meeting ended nothing changed with regard to the new Colorado rule, but there was a better understanding of difficulties experienced in Colorado regarding whirling disease management. The Colorado rule will become effective on January 1, 2001. However, those in the process of testing fish will be given additional time until the testing is completed. The FHPB has sent a letter to Colorado officials outlining the concerns the Utah Aquaculture Association is experiencing. Colorado agreed to provide a letter clarifying conflicting dates and other issues. This letter has not been received.

FISH HEALTH PROGRAM STATUS DURING THE LAST FOUR YEARS

From 1996 to 1999 numbers of water quality tests performed, the total number of aquaculture facilities and the total number of fee fishing facilities in the Fish Health Program have increased. In 1996 a total of 13 water quality tests were performed at aquaculture facilities. In 1999 a total of 45 water quality tests were conducted. The fee fishing facility is increasingly popular with the public, increasing 66 per cent since 1966. The greatest increase in the number of aquaculture facilities over the last three years occurred in fee-fishing facilities. From 1997 to 1999, numbers of fee fishing facilities increased from 48 to 88, an increase of 40 facilities. The current number of fee-fishing facilities has almost doubled since 1997.

Numbers of fish health inspections have also increased since 1996. Aquaculture facility inspections have leveled off at 34 in 1999. All inspections, water quality tests and surveys have been and will continue to be done without increases in personnel or budget.

The following chart reflects the increases in facility numbers, water quality tests and inspections during the last four years.



	1996	1997	1998	1999
Facilities Total	80	81	84	122
Inspections Fish Health	18	22	31	32
Tests Water Quality	13	23	12	45
Facilities Fee Fishing	49	48	52	88
Facilities Aquaculture	31	33	32	34

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RESULTS OF FISH HEALTH SURVEY

On June 8, 2000 a questionnaire regarding the performance of the Fish Health Program of the Utah Department of Agriculture and Food was sent to all aquaculture clients. The survey covered on-site inspections, water quality tests, disease diagnostic tests and help provided over the telephone, etc. The survey was intended to assist the Utah Department of Agriculture and Food in improving service. Rating points ranged from excellent (5), good (4), fair (3), poor (2) and N/A (1). Each of the 25 returned surveys was carefully reviewed with the following calculated results:

- Assistance given to the owner/ operator with questions averaged 5.0. All operators gave a score of 5.
- Courteous and professional service averaged 4.96. One operator gave a rating of 4, and twenty-four operators gave ratings of 5.
- Helped resolve problems and concerns averaged 4.92. One operator gave a rating of 3, and twenty-four each gave a rating of 5.
- Overall Fish Health Program rating averaged 4.84. Two operators gave ratings of 3, and twenty-three operators gave ratings of 5.
- Program has the provider's best interest in heart averaged 4.64. Five operators gave a rating of 4, two operators gave a rating of 3, and eighteen operators each gave a rating of 5.
- The average rating of all 16 questions asked on 25 forms was 4.85 out of a possible 5.0. The total rating was at 97% of the possible points. Of the 2,000 possible points, 1944 were provided to the program.

We appreciate those who participated in this survey. If there is anything you believe we could do to help improve our program please let us know.

FISH GROWER QUESTIONS FISH IMPORTATION PROCESS

On May 23, 2000 the Legislature's Administrative Rules Committee met with the Utah Department of Agriculture and Food in response to a charge issued by a Utah fish grower. The grower, who stated he is a long time member and representative of the Utah Aquaculture Association, complained to lawmakers that fish health specialists are practically regulating him out of business. He said, "in their zeal to keep the dreaded whirling disease out of Utah streams the state agency is squashing businesses." In a letter to the House Speaker the grower wrote, "I feel like I am the victim of an attempt to drive me out of business. We want testing so we have reasonable assurance that we are buying disease-free fish, but we don't want to be driven out of business to assure that no fish diseases exist in the state." The grower listed examples of hatcheries where he could not obtain fish because they were deemed contaminated by Agriculture.

State head veterinarian Dr. Michael Marshall said, "agriculture is just employing standard protocol to keep the diseased fish out of Utah waters." He also said, "this is about importation of fish into the State of Utah. We're careful about that. It's called risk management. We are following rules set by the Fish Health Policy Board."

The legislative staff members asked if Utah is the only state blocking trout importation from the hatcheries in question. Aquaculture was given an assignment to determine if other western states were stricter or more lenient than Utah regarding the importation of fish contaminated with disease. Please refer to the results of findings in this newsletter from an article regarding a survey of the importation of contaminated trout in western states (see page 2). A newspaper article on the grower's charge was printed in the Ogden Standard Examiner on Wednesday, May 24, 2000.

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negative. Remediation actions are undertaken if the results are positive.

All newly licensed aquaculture facilities are inspected initially six months after receiving fish and then six months later. The Fish Health Policy Board recently submitted a change through the rule committee to change this time frame (see article in newsletter on "Rule Change"). Only facilities with clean fish are permitted to sell live fish. The Fish Health Program also responds to consumer and operator complaints. They provide on-site diagnostic and histological services as needed. They respond to the concerns and requests of their providers, at no charge. Fish shocking equipment is used to collect fish from ponds and streams for diagnostic purposes.

Kent and Dr. Marshall sit on the Fish Health Policy Board that normally meets monthly to determine rules, policies, needs and procedures for aquaculture. The Fish Health Program coordinates efforts with the Utah Division of Wildlife Resources (UDWR), who is responsible for species approval and site recommendations. Investigations have been conducted, often jointly with DWR, to find individuals who operate facilities without a license. Hearings may be held to hear the violator's side of the issues. Warning letters and fines may be issued for non-compliance to law.

The Fish Health Program participates in a UDAF educational program for local elementary schools. Lessons center around aquaculture and fish health. Specialists also participate in outdoor shows by helping the Utah Aquaculture Association with booths and presentations. It is the aim of the Fish Health Program to assist aquaculture operators to succeed in business and still prevent fish diseases. Often specialists work overtime and extra long days to complete a task. Additional trips may be necessary to aquaculture facilities to collect ovarian fluids during spawning times.